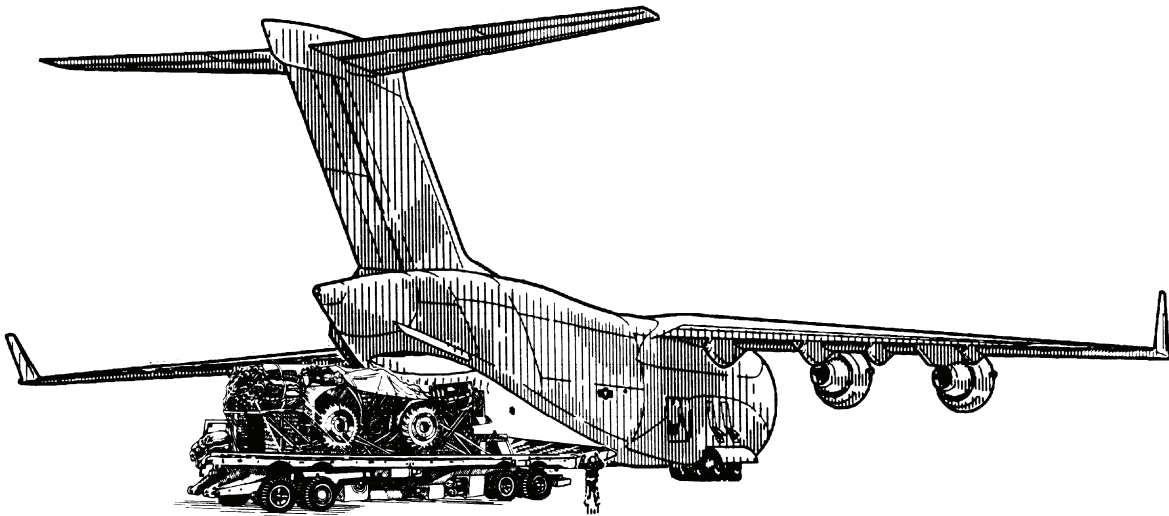


**FM 4-20.116
TO 13C7-1-13**

**Airdrop of Supplies and Equipment:
Reference Data for Airdrop Platform Loads**



MAY 2006

DISTRIBUTION RESTRICTION: Approved for public release; distribution is unlimited

**Headquarters
Department of the Army
Department of the Air Force**

This page intentionally left blank.

Field Manual
No. 4-20.116
Technical Order
No. 13C7-1-13

Headquarters
Department of the Army
Department of the Air Force
Washington, DC, 10 May 2006

Airdrop of Supplies and Equipment: Reference Data for Airdrop Platform Loads

Contents

	Page
	PREFACEviii
	INTRODUCTION.....ix
Chapter 1	REFERENCE TABLES 1-1
	General..... 1-1
	Textile Terminology 1-1
Chapter 2	RIGGED LOAD REFERENCE DATA..... 2-1
	Section I – Introduction..... 2-1
	General..... 2-1
	Type V Platform..... 2-1
	Combat-Expendable Platform 2-1
	Maritime Cargo Aerial Delivery Systems Platform 2-1
	Dual Row Airdrop Systems Platform 2-1
	Section II –Low-Velocity Airdrop on Type V Platform 2-2
	Section III – Low-Velocity Airdrop on Combat Expendable Platform 2-140
	Section IV – Low-Velocity Airdrop on Maritime Aerial Delivery System Platform 2-149
	Section V – Low-Velocity Airdrop on Dual Row Airdrop System Platform 2-150
Chapter 3	AIRLIFT CAPABILITIES..... 3-1
	General..... 3-1
	C-130 Hercules..... 3-1
	C-17 Globemaster 3-1
	GLOSSARY Glossary-1
	REFERENCESReferences-1

Distribution Restriction: Approved for public release; distribution is unlimited.

***This publication supersedes FM 4-20.116/TO 13C7-1-13, 20 August 2001.**

Figures

Figure 2-1. One Military Utility Vehicle (M-Gator) Rigged on an 8-Foot Platform	2-2
Figure 2-2. Two Military Utility Vehicles (M-Gator) and Equipment Box Rigged on a 20-Foot Platform.....	2-3
Figure 2-3. One Military Utility Vehicle (M-Gator) and an A-22 Cargo Bag on a 12-Foot Platform	2-4
Figure 2-4. M-Gator with First Response Expeditionary (FRE) Fire Vehicle on a 12-Foot Platform	2-5
Figure 2-5. Bulk Supplies on an 8-Foot Platform.....	2-6
Figure 2-6. Bulk Supplies in A-22 Cargo Bags on an 8-Foot Platform	2-7
Figure 2-7. Bulk Supplies on a 12-Foot Platform.....	2-8
Figure 2-8. Forward Area Surgical Team (FAST) Equipment on a 12-Foot Platform	2-9
Figure 2-9. 105-mm Ammunition on a 16-Foot Platform	2-10
Figure 2-10. 155-mm Ammunition on a 16-Foot Platform	2-11
Figure 2-11. 20-mm Ammunition on a 16-Foot Platform	2-12
Figure 2-12. Mass Supply Boxes on a 16-Foot Platform.....	2-13
Figure 2-13. Mass Supply Boxes on a 20-Foot Platform.....	2-14
Figure 2-14. Palletized Load System (PLS) Pallet with 105-mm Ammunition on a 24-Foot Platform.....	2-15
Figure 2-15. PLS with A-22 Containers on a 24-Foot Platform	2-16
Figure 2-16. 155-mm Ammunition Modular Artillery Charge System (MACS) Rigged on a 16-Foot Platform.....	2-17
Figure 2-17. 155-MM Ammunition (MACS PAC) Rigged on a 20-Foot Platform	2-18
Figure 2-18. 3/4-Ton Cargo Trailer	2-19
Figure 2-19. M998 Cargo/Troop Carrier	2-20
Figure 2-20. M1025 Armament Carrier	2-21
Figure 2-21. M1025 Armament Carrier with Additional Accompanying Ammunition Load on a 20-Foot Platform.....	2-22
Figure 2-22. M1025 Armament Carrier Rigged with Striker	2-23
Figure 2-23. M56 Smoke Generator Rigged in M1113.....	2-24
Figure 2-24. M1114-Up-Armament Carrier.....	2-25
Figure 2-25. M1151 Expanded Capacity Armament Carrier	2-26
Figure 2-26. Two M998 Trucks	2-27
Figure 2-27. Ground Mobility Vehicle	2-28
Figure 2-28. M102 Howitzer Rigged with 17 Boxes of Ammunition	2-29
Figure 2-29. M102 Howitzer Rigged with 23 Boxes of Ammunition	2-30
Figure 2-30. M102 Howitzer with 1 1/4-Ton Truck	2-31
Figure 2-31. M119 Howitzer Rigged with 30 Boxes of Ammunition	2-32
Figure 2-32. M119 Howitzer Rigged with 81-Millimeter Mortar	2-33
Figure 2-33. M119 Howitzer Rigged with 1 1/4-Ton Truck.....	2-34

Figure 2-34. Two M119 Howitzers	2-35
Figure 2-35. Two M119 Howitzers with Light Ammunition	2-36
Figure 2-36. Two M119 Howitzers Rigged with Two 81-mm Mortars	2-37
Figure 2-37. M101A1 Howitzer.....	2-38
Figure 2-38. Type 1 D-5B Tractor Dozer.....	2-39
Figure 2-39. John Deere 450G Lt Full-TrackeD Bulldozer	2-40
Figure 2-40. Deployable Universal Combat Earthmover (DEUCE)	2-41
Figure 2-41. Three 250-Gallon Water Drums on an 8-Foot Platform	2-42
Figure 2-42. Three 250-Gallon Water Drums on a 12-Foot Platform	2-43
Figure 2-43. Mobile Microwave Landing System (MMLS) in an M998 and a 3/4-Ton Trailer	2-44
Figure 2-44. Standard Integration Command Post System (SICPS) with the CHS-2.....	2-45
Figure 2-45. Command Assault Vehicle (CAV).....	2-46
Figure 2-46. M998 Cargo/Troop Carrier (Two Seater) with GRC/206 Air Force Pallet	2-47
Figure 2-47. M998 Cargo/Troop Carrier (Four Seater) with GRC/206 Air Force Pallet.....	2-48
Figure 2-48. S-318/G Shelter with AN/GRC-122 Communication Equipment.....	2-49
Figure 2-49. S-502 Shelter with AN/GRC-142 Communications Equipment.....	2-50
Figure 2-50. PU-619M Power Unit	2-51
Figure 2-51. PU-620 Power Unit	2-52
Figure 2-52. M198 155-mm Howitzer.....	2-53
Figure 2-53. M198 155-mm Howitzer with Accompanying Ammunition	2-54
Figure 2-54. M198 155-mm Howitzer with MACS.....	2-55
Figure 2-55. Type 1 Towed Roller.....	2-56
Figure 2-56. M435 Towed Roller.....	2-57
Figure 2-57. 13-Wheeled Towed Roller	2-58
Figure 2-58. 11-Wheeled Towed Roller	2-59
Figure 2-59. MDG 96 Sheepsfoot Roller.....	2-60
Figure 2-60. Thirteen Wheel (Model PT-13) Towed Roller	2-61
Figure 2-61. Vibratory Compactor (Model CS-433C).....	2-62
Figure 2-62. Vibratory Compactor (Model CS-433P).....	2-63
Figure 2-63. M416 Trailer with Eight Tube-Launched, Optically Tracked, Wire- Guided (TOW) Missiles	2-64
Figure 2-64. TOW Missiles Rigged in A-22 Cargo Bags.....	2-65
Figure 2-65. TOW Missiles Rigged on a 12-Foot Platform	2-66
Figure 2-66. M966 TOW Carrier.....	2-67
Figure 2-67. M4K 4,000 Pound Capacity Forklift	2-68
Figure 2-68. M270 4,000 Pound Capacity Forklift.....	2-69
Figure 2-69. M271 4,000 Pound Capacity Forklift.....	2-70
Figure 2-70. 6,000 Pound Capacity Forklift.....	2-71
Figure 2-71. 1 1/2-Ton Trailer	2-72
Figure 2-72. M149A1 400-Gallon Water Trailer	2-73

Contents

Figure 2-73. M167A1 Gun	2-74
Figure 2-74. M167A2 Gun with 1 1/4-Ton Truck	2-75
Figure 2-75. Forward Area Refueling Equipment (FARE) with Two 500-Gallon Fuel Drums	2-76
Figure 2-76. FARE Rigged in an M101A1 3/4-Ton Trailer	2-77
Figure 2-77. FARE with Seven 500-Gallon Fuel Drums	2-78
Figure 2-78. 350-GPM Wheel-Mounted Pumping Assembly with Filter/Separator	2-79
Figure 2-79. Three 500-Gallon Drums with Pump and Separator	2-80
Figure 2-80. Four 500-Gallon Drums with Pump and Separator	2-81
Figure 2-81. Five 500-Gallon Drums with Pump and Separator	2-82
Figure 2-82. Six 500-Gallon Drums with Pump and Separator	2-83
Figure 2-83. AAFARS with Three 500-Gallon Fuel Drums	2-84
Figure 2-84. AAFARS with Four 500-Gallon Fuel Drums	2-85
Figure 2-85. AAFARS with Five 500-Gallon Fuel Drums	2-86
Figure 2-86. AAFARS with Six 500-Gallon Fuel Drums	2-87
Figure 2-87. AAFARS with Seven 500-Gallon Fuel Drums	2-88
Figure 2-88. Small Emplacement Excavator (SEE).....	2-89
Figure 2-89. JD410 Tractor.....	2-90
Figure 2-90. Fifteen-Ton Tilt Bed Trailer.....	2-91
Figure 2-91. Five-Bay, Single-Story, Medium Girder (Fixed) Bridge	2-92
Figure 2-92. Two-Bay Components for the Seven-Bay, Single-Story, Medium Girder (Fixed) Bridge	2-93
Figure 2-93. Mobile Over Snow Transport (MOST).....	2-94
Figure 2-94. M1025 or M1026 Armament Carrier with Technical Defense Alert Radar System (TDARS).....	2-95
Figure 2-95. 120-mm Mortar and 1 1/4-Ton Truck	2-96
Figure 2-96. 1 1/4-Ton Truck with 120-mm Mortar	2-97
Figure 2-97. Koehring 7 1/2-Ton Crane.....	2-98
Figure 2-98. M998 1 1/4-Ton Truck with Six Stinger Weapon Systems.....	2-99
Figure 2-99. Avenger Air Defense Weapons System with Environmental Control Unit (ECU) and M1097A2 Truck	2-100
Figure 2-100. Thirty-Six Dragon or Dragon II Missiles in One-Round Containers	2-101
Figure 2-101. Four Dragon or Dragon II Missiles in 15-Round Containers	2-102
Figure 2-102. Four A-22 Cargo Bags with Dragon or Dragon II Missiles in One-Round Containers	2-103
Figure 2-103. Four Dragon or Dragon II Missiles in 15-Round Containers Rigged in Four A-22 Cargo Slings	2-104
Figure 2-104. Thirty-Six Javelin Rounds as a Mass Supply Load	2-105
Figure 2-105. 1 1/2-Ton Ammunition Trailer.....	2-106
Figure 2-106. Mine Clearing Line Charge (MICLIC) on 2 1/2-ton Trailer	2-107
Figure 2-107. 600-GPH Reverse Osmosis Water Purification Unit (ROWPU)	2-108
Figure 2-108. Lightweight Water Purifier (LWP).....	2-109
Figure 2-109. Whole Blood	2-110

Figure 2-110. Two Drums without Pumping Assembly	2-111
Figure 2-111. Three Drums without Pumping Assembly	2-112
Figure 2-112. Three Drums with Pumping Assembly.....	2-113
Figure 2-113. Four Drums without Pumping Assembly	2-114
Figure 2-114. Five Drums without Pumping Assembly	2-115
Figure 2-115. Six Drums without Pumping Assembly	2-116
Figure 2-116. Six Drums with Pumping Assembly	2-117
Figure 2-117. Seven Drums without Pumping Assembly.....	2-118
Figure 2-118. Seven Drums with Pumping Assembly.....	2-119
Figure 2-119. M996 2-Litter Armored Ambulance.....	2-120
Figure 2-120. M997 4-Litter Ambulance.....	2-121
Figure 2-121. IC45 Crawler Carrier	2-122
Figure 2-122. M973A 1 1/2-Ton Cargo Carrier Small Unit Support Vehicle (SUSV).....	2-123
Figure 2-123. Ingersol-Rand Model 250-CFM Trailer-Mounted Air Compressor	2-124
Figure 2-124. M1081 2 1/2-Ton Cargo Truck.....	2-125
Figure 2-125. M1081 2 1/2-Ton Cargo Truck with Accompanying Load	2-126
Figure 2-126. M1093 5-Ton 6x6 Standard Cargo Truck.....	2-127
Figure 2-127. M1094, 5-Ton Dump Truck.....	2-128
Figure 2-128. M-1095, 5-Ton Trailer	2-129
Figure 2-129. 130G Motor Grader.....	2-130
Figure 2-130. 950B Scoop Loader	2-131
Figure 2-131. 950B Scoop Loader with Five-Foot Forklift Attachment	2-132
Figure 2-132. 950B Scoop Loader with Seven-Foot Forklift Attachment.....	2-133
Figure 2-133. 613WD Water Distributor.....	2-134
Figure 2-134. 613S Type I Scraper	2-135
Figure 2-135. Rapid Runway Repair (RRR) Kit on 24-Foot Platform	2-136
Figure 2-136. Rapid Runway Repair (RRR) Kit on 20-Foot Platform	2-137
Figure 2-137. Rapid Runway Repair (RRR) Kit-ALPHA.....	2-138
Figure 2-138. Trailer-Mounted Engineer Electrical Tool Outfit.....	2-139
Figure 2-139. Zodiac Mark III Rubber Raiding Craft	2-140
Figure 2-140. Zodiac Mark III Futura Rubber Raiding Craft.....	2-141
Figure 2-141. Z-Bird Rubber Raiding Craft	2-142
Figure 2-142. Zodiac K40 Rubber Raiding Craft.....	2-143
Figure 2-143. Zodiac K50 Rubber Raiding Craft.....	2-144
Figure 2-144. Double Zodiac F470U Boat	2-145
Figure 2-145. One Motorcycle.....	2-146
Figure 2-146. Two Motorcycles	2-147
Figure 2-147. Four Wheeled Quad-Runner	2-148
Figure 2-148. Naval Special Warfare Rigid Inflatable Boat (NSW RIB).....	2-149
Figure 2-149. M998/M1038/M1097 Cargo/Troop Carriers.....	2-150
Figure 2-150. M1097 Variant Cargo/Troop Carrier	2-151

Contents

Figure 2-151. M1025 Armament Carrier	2-152
Figure 2-152. M1121 TOW Carrier	2-153
Figure 2-153. M1114 Up-Armored HMMWV	2-154
Figure 2-154. M119 105-mm Howitzer	2-155
Figure 2-155. M101A1/M101A2 3/4-Ton Cargo Trailer	2-156
Figure 2-156. T-200 Bobcat Compact Track Loader	2-157
Figure 2-157. T-200 Bobcat Compact Track Loader Accessory Load	2-158
Figure 2-158. Javelin (Metal) Containers.....	2-159
Figure 2-159. Javelin (Plastic) Containers.....	2-160
Figure 2-160. 105-mm Ammunition Mass Supply Load	2-161
Figure 2-161. M-Gator with Accompanying Load	2-162

Tables

Table 1-1. Chains.....	1-1
Table 1-2. Cloth, Duck, Cotton, Type III- Army Duck.....	1-2
Table 1-3. Cloth, Duck, Nylon	1-2
Table 1-4. Cloth, Duck, Nylon, Parachute Packs	1-2
Table 1-5. Cloth, Muslin, Cotton	1-2
Table 1-6. Cloth, Muslin, Cotton (Parachute Canopy).....	1-2
Table 1-7. Cloth, Nylon Parachute Cargo.....	1-3
Table 1-8. Cloth, Parachute, Nylon, Cargo, and Deceleration	1-3
Table 1-9. Cloth, Parachute, Nylon.....	1-3
Table 1-10. Cloth Sateen, Cotton	1-3
Table 1-11. Cord, Nylon.....	1-3
Table 1-12. Cord, Nylon, Coreless	1-4
Table 1-13. Cord, Elastic, Exerciser and Shock Absorber for Aeronautical Use	1-4
Table 1-14. Cord, Rayon, without Core, Braided.....	1-5
Table 1-15. Cord, Cotton, General-Purpose, Type I.....	1-5
Table 1-16. Felt Sheet, Polyester, Needle Punched	1-5
Table 1-17. Grommet, Metallic.....	1-6
Table 1-18. Lumber.....	1-10
Table 1-19. Nails	1-12
Table 1-20. Parachute, Cargo.....	1-14
Table 1-21. Parachute, Cargo Extraction	1-14
Table 1-22. Platform, Cargo Airdrop, Type V	1-15
Table 1-23. Platform, Dual Row Airdrop System	1-15
Table 1-24. Plywood, Flat Panel	1-15
Table 1-25. Tape, Nylon, Parachute.....	1-16
Table 1-26. Type XXVI, Sling, Cargo, Airdrop.....	1-16
Table 1-27. Sling, Endless	1-16

Table 1-28. Tape, Textile, Cotton, General-Purpose	1-17
Table 1-29. Tape, Textile, Nylon	1-17
Table 1-30. Tape and Webbing, Textile, Rayon.....	1-18
Table 1-31. Tape, Textile and Webbing, Textile, Reinforcing, Nylon.....	1-18
Table 1-32. Tape and Webbing, Textile, Cotton Reinforcing, Woven.....	1-19
Table 1-33. Thread, Nylon.....	1-20
Table 1-34. Thread, Cotton	1-21
Table 1-35. Webbing, Textile, Woven Nylon.....	1-22
Table 1-36. Webbing, Textile, Nylon – Universal Static Line	1-22
Table 1-37. Webbing Nylon, Tube Edge Construction.....	1-23
Table 1-38. Webbing, Textile, Nylon, Tubular.....	1-23
Table 1-39. Webbing, Textile, Cotton, Warp	1-24
Table 1-40. Webbing, Textile, Elastic, Cotton	1-24
Table 1-41. Webbing, Textile, Cotton, General-Purpose	1-25
Table 1-42. Wire Strand (6 x 19).....	1-26
Table 1-43. Wire Strand, Steel (Corrosion Resistant), Preformed (Aircraft Application)	1-26
Table 1-44. Miscellaneous Hardware and Equipment	1-27

Preface

SCOPE

This manual provides a ready-reference planning guide for loads rigged for airdrop. It illustrates the rigged load and contains dimensional data, weight, and center of balance (CB) for each load. Information is also provided on aircraft, extraction parachutes and reference tables of miscellaneous information on materials used to fabricate and maintain air items and to rig airdrop equipment.

USER INFORMATION

The proponent of this publication is United States Army Training and Doctrine Command (TRADOC). You are encouraged to report any errors or omissions and to suggest ways of making this a better manual.

Army personnel, send your comments on DA Form 2028 (*Recommended Changes to Publications and Blank Forms*) directly to:

Director
Aerial Delivery and Field Services Department
USA Quartermaster Center and School
710 Adams Avenue
Fort Lee, Virginia 23801-1502

Air Force personnel, send your reports on AFTO Form 22 through your respective command Weapons and Tactics to:

Headquarters
Air Mobility Command (AMC/A39T)
402 Scott Drive, Unit 3AI
Scott AFB, Illinois 62225-5302

Air Force personnel in Special Operations Command, send your reports on AFTO Form 22. HQ AMC/A39T will consolidate and forward changes to:

Director
Aerial Delivery and Field Services Department
USA Quartermaster Center and School
710 Adams Avenue
Fort Lee, Virginia 23801-1502

Also send an information copy of AFTO Form 22 to:

WR-ALC/LEET
295 Byron Street
Robins AFB, Georgia 31098-1611

This publication applies to the Active Army, the Army National Guard/Army National Guard of the United States, and the United States Army Reserve unless otherwise stated.

Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to the male gender.

Introduction

GENERAL

The information in this manual may be used to compute aircraft requirements and to assist the rigger and loadmaster during joint inspection of airdrop loads. The publication containing the procedure for preparing and rigging each load is indicated with the data for the load.

SPECIAL CONSIDERATIONS

The special considerations applicable to the specific loads are given in the appropriate field manual/technical order.

This page intentionally left blank.

Chapter 1

Reference Tables

GENERAL

1-1. This chapter contains reference tables of miscellaneous information on materials used to fabricate and maintain air items and to rig airdrop equipment. If detailed information, other than that listed in these tables, is required on specific materials, the DOD Index of Specifications and Standards should be consulted.

TEXTILE TERMINOLOGY

1-2. The textile products listed in this chapter are defined as follows:

- **Cord.** Cord is a fibrous, braided, cordage item of any diameter.
- **Tape.** Tape is a narrow fabric, woven or knitted, produced in widths up to and including 8 inches and in weights up to but not including 0.42 ounces per linear yard of 1-inch width.
- **Thread.** Thread is a thin, twisted, smooth strand or filament of vegetable, animal, mineral, or synthetic material, spun out to considerable length, used mainly for hand sewing and machine sewing. The use of thread is determined by a letter or numerical designation which is synonymous.
- **Webbing.** Webbing is a narrow fabric, woven or knitted, produced in widths up to and including 12 inches and in weights of 0.42 ounces or over per linear yard of 1-inch width.

Table 1-1. Chains

Size (in)	Weight (lb per lin ft)	Common iron	Safe working load (lb)		
			High-grade iron	Soft steel	Special steel
1/4	0.8	512	563	619	1240
3/8	1.7	1,350	1,490	1,650	3,200
1/2	2.5	2,250	2,480	2,630	5,250
5/8	4.3	3,470	3,810	4,230	7,600
3/4	5.8	5,070	5,580	6,000	10,500
7/8	8.0	7,000	7,700	8,250	14,330
1	10.7	9,300	10,230	10,600	18,200
1 1/8	12.5	9,871	10,858	11,944	21,500
1 3/8	18.3	14,717	16,188	17,807	32,051